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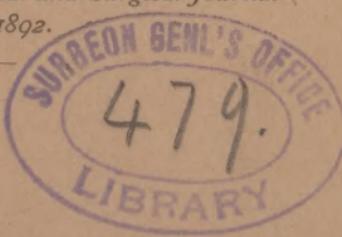
Operative Treatment of Goitre.

BY

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THE OPERATIVE TREATMENT OF GOITRE.¹

BY J. COLLINS WARREN, M.D.

TUMORS of the thyroid gland are not common in this country, and consequently the experience of American surgeons is small as compared with that of many on the continent of Europe, where within the last decade the operative treatment has received a considerable impetus.

The dangers of goitre appear to be due principally to dislocation and compression of the trachea and consequent interference with the respiration. There is also a certain amount of venous congestion in the cervical region, with consequent dilatation of the right heart, which may be followed by degenerative changes in the tissue of that organ. There may also exist some bronchiectasis and emphysema.

Pressure upon the trachea causes, in advanced cases of the disease, displacement and flattening of the tracheal canal, so that it presents an appearance known as the scabbard-like distortion. There is also, according to Rose, a softening of the tracheal rings, due to pressure, giving rise to a condition which favors the formation of a kink in the canal, following quick movements of the head, while the body is motionless. Sudden death may result under these circumstances. The disorders of respiration, seen in animals after removal of the thyroid gland, are regarded by Horsley as due to changes in the functional ability and activity of the respiratory centre, due to changes brought about in the nutrition of the tissues by the cessation of function of the gland.

¹ Read before the Boston Society for Medical Improvement, February 8, 1892.

The difficulties and dangers of thyroidectomy have usually been considered as objections to the operation. On this account many modes of treatment have been devised. It is not my purpose to give you this evening a complete summary of the various forms of treatment of goitre. I will, therefore, briefly refer only to one or two methods in which I have had some experience.

For clinical purposes the enlargement of the thyroid gland may be divided into three varieties — the vascular, the parenchymatous and the cystic. A favorite method of treating the vascular goitre is by electrolysis, and many of you are familiar with the monograph by Dr. Robert Amory. His results show that the operation is well suited to this variety, and if complete cure cannot be effected in all cases, considerable diminution in the size of the gland may be procured. Good results can also doubtless be attained in some of the parenchymatous types of the disease by this method.

The internal use of iodine may be of some use in young persons in diffuse forms of goitre; but, according to Bruns, if no change occurs in the size of the tumor very soon after the use of the drug, improvement is not to be looked for.

Parenchymatous injections of iodine have been employed, particularly in the cystic variety. A number of cases of sudden deaths are, however, reported as following the use of this remedy, although many favorable results have been obtained.

Death may be caused by embolism, and also by paralysis of the abductor muscles through reflex irritation following an absorption of the iodine into the pneumogastric nerve or the recurrent laryngeal.

Wörner reports 75% of successful cases by this method, and in one case a single cyst, the size of a

man's head, was cured in this way. It appears to be best adapted to single, thin-walled cysts. The possibility of suppuration following this mode of treatment should be considered, as well as the occurrence of haemorrhage from the interior of such cysts when once they have been opened.

The operation of thyroidectomy appears to be indicated in cases when the difficulty of breathing has become a prominent symptom, or when the tumor shows a tendency to grow rapidly and there is also some disturbance in the respiration. For cosmetic purposes solely, the operation should not be performed, except, perhaps, for a small nodule which can easily be enucleated.

The mortality of the operation has dropped, according to Bruns, from 41%, in 1850, to 5.8%, in 1884. Kocher reports 250 operations, with only six deaths.

The incisions recommended by different operators are either Y or V shaped, in the case of removal of both lateral lobes, or along the border of the sterno-mastoid if one lobe only is to be removed.

Several large subcutaneous veins are usually found running vertically over the front of the tumor. Their lumen is very capacious, and they retract quickly beneath the margins of the incision, and unless promptly secured with forceps are liable at any moment to give rise to troublesome bleeding. In order to reach the surface of the tumor, the edge of the sterno-mastoid must be sought for, and that muscle, which is thin and flattened, must be drawn aside. In two of my cases it was necessary to divide the sterno-thyroid and sterno-hyoid muscles, but the omo-hyoid, which frequently has to be divided in these operations, was not seen. On reaching the tumor, it is important to divide all layers of connective tissue until the capsule is reached. It is also important to avoid cutting into the tumor

itself, owing to the difficulty in controlling the haemorrhage which ensues. Starting now from the median line the lobe should be slowly and cautiously separated from the surrounding tissues by the finger or some blunt instrument, and an effort made to reach its upper and outer border, beneath the margin of which the superior thyroid artery will be found. This should be clamped, as also a number of smaller vessels which have been divided in the meantime. The tumor is then drawn inwards and downwards until the inferior thyroid is reached, which must also be clamped and divided. Great care must be taken at this point to avoid clamping or cutting the recurrent laryngeal nerve, which lies close to and behind this vessel. The nerve is always hard to find, and in no case have I seen it. By keeping close to the surface of the tumor, and avoiding wandering between outlying layers of connective tissue, this mishap can be avoided probably in the great majority of cases. Large masses of tissue should not be hastily caught up with the forceps during this period of the operation. If the artery can be found and isolated, it would be well to pass a ligature around it with an aneurism needle. On approaching the trachea the knife has to be used more freely, as the tumor is usually quite adherent to its anterior surface.

In very large and adherent growths the operator may content himself with dividing the isthmus, as the tumor may subsequently undergo atrophy after this operation. Pressure on the trachea will be relieved also in this way.

Whatever the method employed be, the bleeding is usually very free, and the operation more or less prolonged. Rose reports a case where 200 ligatures were applied, and the operation lasted several hours. The larger types of goitre, so familiar to the Swiss tourist,

are fortunately rarely seen in this country. I am in the habit of using a small drainage-tube to avoid pressure on the trachea during the primary serous oozing.

The most important feature of the operation remains to be mentioned ; that is, the necessity of leaving behind a portion of the thyroid gland, as myxoedema is almost certain to develop if all the gland-tissue has been removed. It is true that quite a number of cases of "total extirpation" have been found without the occurrence of this unfortunate sequel, but it is probable either that a portion of gland-tissue has unwittingly been left behind, or that accessory glands existed. The presence of such glands is stated by one writer to be demonstrated in about one-half the cases examined. They lie in different places — near the arch of the aorta, at the side of the trachea, or between it and the oesophagus, or near the hyoid bone.

There are various theories still put forward as to the functions of this gland. By some it is supposed to be a blood-gland connected in some way with the development of the blood-corpuscle. It is also supposed to remove certain deleterious substances from the blood, or to prepare for the nerves certain substances which are necessary for their proper nutrition. It is also supposed to be a regulator of the circulation of the brain. It is probable, as shown from experiments on cats and dogs, all of which died after removal of these glands, that the organ plays an important part in the nutrition of the nervous system. Before this peculiar result of the removal of the gland was understood a large number of cases of total extirpation were performed. Kocher found a development of myxoedema, or cachexia strumipriva, as it was originally called, in all but two of eighteen cases : as a recurrence of the growth took place in both of these cases it is probable that a portion of the gland was left behind in both in-

stances. Reverdin in eleven cases of total removal had but five cases of cachexia.

In those cases where only a small fragment is left behind the symptoms of myxœdema may develop to a certain extent and subsequently disappear after the fragment enlarges, as is usually the case. They may grow to considerable size, as the following case by Bircher shows :

A servant girl, twenty-seven years old, underwent the operation of total extirpation for a goitre accompanied with difficulty of breathing. The operation was followed by paralysis of both recurrent laryngeal nerves, the resulting hoarseness disappearing seven weeks later. Four weeks after the operation she became languid and sleepy, so as to be unfit for housework. Her mental condition deteriorated ; her expression changed ; and her complexion became pale and the skin wrinkled. This condition continued for two months, and gradually improved ; and at the end of six months had entirely disappeared. In front of the larynx there was now to be seen a fragment of the thyroid gland, which had grown to the size of a filbert. It had evidently been left behind by accident.

Another case described by this author is of peculiar interest, as the symptoms of myxœdema were temporarily relieved by the grafting of a fragment into the peritoneal cavity and apparently permanently removed by a second operation of the same kind.

A peasant woman, thirty-three years old, slightly affected by cretinism, was operated upon for partial removal of the thyroid gland. A small lobe, which it was intended to leave behind, came out accidentally with the rest of the tumor. The wound healed by first intention. Two months later she returned, and reported attacks of severe cramps. She was easily tired, and was always sleepy. Her appearance had changed entirely. Her face had become swollen under the eyes and about the cheeks and lips. Her gait was staggering. Her intellect was much deteriorated.

Soon after entering the hospital she had an epileptic seizure. Six months later the marasmus had become so pronounced that she could not leave the bed. It was decided to try implantation of thyroid tissue into the abdominal cavity. Laparotomy was performed simultaneously with thyroidectomy in a case of partially cystic goitre. Two fragments, about the size of filberts, were introduced through a small incision into the peritoneal cavity. A few days later improvement began to show itself, and in twelve days the patient was able to leave her bed and to walk about the ward. Her intelligence improved somewhat. At the end of two months, however, a relapse occurred; and the operation of implantation was repeated, about five times the amount of gland-tissue being introduced into the abdomen on this occasion. The myxoedema swelling soon began to disappear; and, in the course of two months, the patient was able to do a good day's work as kitchen-maid. Six months after the second implantation the patient was still in good health.

The non-operative or atrophic myxoedema is a rare disease and occurs sporadically, not being indigenous to any particular quarter of the globe. It is found more frequently in women than in men or children. It is supposed to have some connection with disturbed genital function, as it occurs frequently at the menopause. The disease develops slowly. The first symptoms are observed in the skin, which becomes rough and dry. The hair, sometimes the teeth, drop out, and the nails become brittle. The skin next becomes oedematous, but there is not as in ordinary oedema pitting on pressure. The face swells first, and loses its expression, later, the head, abdomen and extremities are affected; genuine oedema may occur in the later stages of the disease when the internal organs have undergone extensive changes. The changes seen in the nervous system are more or less well marked. The reflexes are diminished; there is slowing of all movements and the gait is a rambling one. The power of co-ordina-

tion is somewhat disturbed. The intellect is at first intact, but later there are delusions, and sometimes delirium. The circulation is feeble; haemorrhages are often seen in the skin and mucous membranes, and the catamenia are irregular. The course of the disease is slow the duration varying from six to twenty years. Death occurs from exhaustion and visceral complications. The pathological changes consist in gelatinous hypertrophy of the connective tissue, particularly of the skin and subcutaneous adipose tissue, with enlargement of the lymphatic vessels. There is also a thickening of the walls of the arteries. The thyroid gland tissue atrophies and gradually disappears and the interstitial fibrous tissue becomes greatly increased in amount.

The operative myxoedema or the cachexia strumipriva has become familiar since the general adoption of the total extirpation of the thyroid — an operation which has in consequence been abandoned. This type runs its course more rapidly. The cerebral irritation is more marked in consequence, and we find vertigo, tetanic spasm and epilepsy in many cases. It may terminate fatally. It is interesting to note in this connection that after thyroidectomy in dogs the pituitary gland is swollen and the cells became vacuolated and ultimately disintegrated the longer the animal survives the operation. In sporadic cretinism when the thyroid gland is lost, the pituitary body has been found to be enlarged.² In this form, however, recovery may occasionally result either by the development of accessory lobes or fragment of gland tissue left behind, or by the implantation of portions of the gland. Those fragments left behind may grow to the size of a walnut, and it is only by the development of these fragments that the patient escapes the disease.

² Horsley.

It is proved by experiment that dogs and cats cannot live without the thyroid gland — the animals become inert, sleepy and slow in movement. The sensibility is diminished and muscular twitchings are frequent. Death occurs in four to twenty-seven days. At least one-third or in some cases one-fourth of the gland must be left to prevent the onset of the fatal cachexia. Schiff found that if a piece of gland was implanted into an animal the thyroid gland could be removed without injury. When animals thus treated were killed a few months later fragments of the original gland implanted were found still remaining. If the implanted gland becomes properly vascularized and resumes its functional activity the cachexia does not show itself, but if the gland undergoes atrophy and degeneration the cachexia supervenes. Colzi and Ewald found that the transfusion of the blood of healthy animals into the circulation of those which had been deprived of the gland delayed the cachexia. Improvement always followed subcutaneous injection of the juice of the gland. These observers conclude that the gland removes from the blood certain substances which are injurious to it if allowed to accumulate — a condition analogous to uræmia after extirpation of both kidneys. Horsley found a diminution in the red corpuscles and an increase in the white corpuscles in experimental myxœdema. There was a diminished power of coagulation and an increase in the amount of globulin and mucin in the serum, and also an increase of mucin in the parotid and submaxillary glands. Horsley holds that the "thyroid gland is a structure essentially connected with the metabolism of the blood and tissues; that in fulfilment of its functions it is hæmopoietic both directly and indirectly, and that it forms, that is, secretes from the blood, a colloidal substance, which is

transmitted *via* the lymphatics from the acini of the gland to the circulation." ⁸

Cretinism is regarded by Bircher as essentially a different disease from myxœdema. It occurs endemically and is found at an early period of life, and is associated with goitre. The change in the facial appearance, the motor disturbances and the alteration in speech and intelligence are common to both diseases, but we do not find the same changes in the hair, skin, and sensation as in myxœdema. In the latter disease the pathological changes are found in the soft parts, but in cretinism the principal deformity is produced by alteration in the form and arrangement of the bones. These are particularly marked in the skull, which is much broader than in the normal state. The departure from the normal condition may be very slight in some forms, little being noticed beyond an enlargement of the thyroid. In another class of cases deaf-mutism is the principal symptom. In the more prominent type the patients are idiotic. The speech is affected in the great majority of all cases, a symptom rarely noticed in myxœdema. It is more common in male adults in its severest type.

The following series of four cases represent the extent of my experience upon the subject. They show that the milder forms can be easily removed by an operation apparently harmless, but one, at the same time, not without its dangers. When, however, we consider the great deformity and discomfort of a large bronchocele and the danger of sudden death, we are hardly authorized in declining to perform the operation.

CASE I. Cyst of thyroid. H. M., seventeen years of age, a domestic, was born in New York, but has lived for many years in Wakefield, Mass. She en-

⁸ British Medical Journal, January 30, 1892.

tered the hospital November 10, 1891. Her father died of consumption and she herself has never been healthy. Seven years ago she first noticed a little tumor in the front of her neck which has grown steadily until two months ago a little additional nodule began to form below. On examination the thyroid gland appears to be symmetrically developed and a swelling about the size of a lemon occupies the median line of the neck, a smaller growth appears to be attached to the tumor at the lower right-hand corner. There had been occasionally slight disturbance of respiration, but the patient was anxious for the removal of the tumor, partly on account of the deformity as it showed a tendency to increase in size. The operation was performed on November 15th. An incision was made in the median line about four inches long over the tumor, which, when exposed, was found to be cystic. When the cyst wall was reached it was enucleated without much difficulty from the normal gland-tissue. There was very little haemorrhage, a quill-drain was inserted and the edges of the incision were brought together by interrupted sutures and a light, dry dressing was applied.

The patient rallied well from the operation, but about five hours after the operation, while my assistant, Dr. Bartol, was in the ward, respiration suddenly ceased, the patient became cyanotic and the jaws were firmly closed. Tracheotomy was performed by Dr. Bartol immediately and an elastic catheter was introduced and retained until a tube could be obtained. The tube was allowed to remain for forty-eight hours. The patient made a rapid recovery and was discharged December 3d with the wound entirely healed. She visited me recently, about a year after the operation, and was in excellent health without any signs of thyroid enlargement.

The following report was made by Dr. Whitney: "Cystic growth from region of thyroid. Section shows several cysts, the largest was the size of a small peach filled with dark, reddish-black fluid, showing blood-corpuscles, granular-corpuscles and cholesterin crystals. Section of wall shows normal thyroid tissue with here and there a tendency to cystic dilatation. Diagnosis: goitre with cystic degeneration."

CASE II. Cyst of thyroid. L. M., age twenty-seven, married; born in Massachusetts, lives in Quincy. Entered the hospital January 5, 1892. Her family history was negative. Was always well and has had five children. Four years ago the patient first noticed a small swelling in the neck which has grown very slowly and has never pained her. She states that she has some difficulty in swallowing and that her breathing is somewhat impeded and that she suffers from dyspnoea on exertion. On examination a tumor the size of a large hen's-egg is seen just below the cricoid cartilage on the right of the median line. It is soft and movable and ascends and descends with the movements of the trachea during the act of swallowing. Pulse 90, strong and regular. The eyes are not prominent.

A laryngoscopic examination was made on January 6th, by Dr. J. P. Clark, who states that the rima glottidis was practically in the median line; motion of cords free, although in respiration the right cord does not move as far from the median line as the left. Some prominence below the right cord of the tracheal wall. No evident diminution of the calibre of the trachea.

Operation, January 9, 1892. An incision parallel to the anterior border of the sterno mastoid muscle was made over the tumor, exposing the wall of the cyst which was carefully dissected out with but little

haemorrhage. It was found to contain a dark fluid. A small drainage-tube was inserted and the edges of the wound brought together by silk sutures.

The stitches were removed on the sixth day, and the wound healed promptly except at the point of drainage where a small sinus remained for two or three weeks.

Dr. W. F. Whitney made the following report of the microscopic examination: "A cystic growth the size of a small peach in one lobe of the thyroid. Microscopic examination showed portions of the gland in the wall of the cyst. Cyst of thyroid."

CASE III. Parenchymatous growth of thyroid. C. M., forty years of age, was born in Canada but lives at present in Boston; is married and had one child eighteen years ago, two still-births since. Her mother and one sister are both the subjects of goitre. Her general health has been good. Eleven years ago the patient first noticed a small swelling corresponding to the right lobe of the gland followed later by a similar condition on the left side, eventually there was enlargement of the isthmus. The tumor has grown slowly and has varied considerably in size from time to time. During the past year there has been an increasing obstruction to respiration. The eyes are not prominent; the pulse is 115 and regular, but not strong. There is dyspnoea on exertion. The cataracta are regular.

On examination a tumor of dumb-bell shape is seen stretched across the trachea. The right lobe is about the size of an orange and the left lobe is the size of a goose-egg. There are numerous enlarged veins running over its surface. It is movable and rises with the larynx on swallowing. There is no pulsation.

Laryngoscopic examination by Dr. J. P. Clark: "Rima glottidis obliquely situated, being turned some-

what to the right. The trachea is bent to the left slightly. No constriction as far down as the fourth



FIG. 1. Before Operation.

or fifth ring. Motion of cords apparently free and equal."

Operation, January 9, 1892. A curved incision with convexity downwards was made from the apex of left



FIG. 2. Cleatrix Fourteen Days after Operation.

lobe to that of the right lobe, and the operation performed as already described. Two small fragments of

gland-tissue are left behind, one in the left lobe about the size of half a walnut, and one in the isthmus of the same dimensions. Two quill tubes were inserted to avoid pressure during the early oozing of the walls of the wound. The stitches and tubes were removed on the third day, and the wound dressed with collodion and cotton. A small collection of pus subsequently formed at the most dependent point of wound, and left a sinus which had not healed three months after the operation, when the patient left the convalescent home. There were at that time no signs of myxoedema.

Microscopical examination by Dr. W. F. Whitney : "Several large, dark, rounded growths from thyroid region. Section showed some small cystic cavities, the walls in places infiltrated with lime salts, but in general the growth was of the character of the thyroid, but with enlarged alveoli containing a colloid material. Bronchocele."

This patient suffered from aphonia for several weeks after the operation, and a laryngoscopic examination showed that the right vocal cord was paralyzed. The voice, however, was subsequently fully restored.

CASE IV. A. S., single, twenty-five years of age, entered the hospital February 1, 1892. She was born in Ireland, and lives at present in Dorchester. Her family history is good. She has always been healthy. Five years ago she first noticed a "bunch below the Adams apple." This has grown steadily since, although it varies at times somewhat in size (Fig. 1). There is no difficulty in swallowing and no change in voice or breathing.

On examination an enlargement of the thyroid gland is seen on both sides, that on the left being about the size of a large orange, and about twice as large as that on the right. The tumor is non-pulsatile and moves

with deglutition. The larynx and trachea are displaced somewhat to the right of the median line. There is no protrusion of the eyes. Extirpation of the gland performed February 6th. A semilunar incision, about five inches in length, was made from the apex of the left lobe downwards and across the median line to a point considerably lower on the left (Fig. 2). A number of large veins were divided, but there was no great difficulty in controlling the bleeding as the capsule was separated from the surrounding tissues. A portion of the right lobe, about the size of a horse-chestnut, was allowed to remain. One quill drainage-tube was inserted, and the edges of the wound were brought together by silk sutures. The dressing was applied loosely, but sufficiently firm to prevent exposure of the wound.

The wound healed by first intention, the drain having been removed on the second day. The photograph (Fig. 2) was taken about two weeks after the operation. A microscopical examination showed a growth similar to that found in Case III.

In a case of large cystic goitre, which recently came under my notice, where tapping and the injection of iodine had been tried, the swelling and signs of suppuration induced me to lay open the sac freely and pack it with iodoform gauze, which operation was successfully performed without any trouble from haemorrhage. The tumor was about the size of a cocoanut. I have not yet heard of the subsequent history of the case.

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